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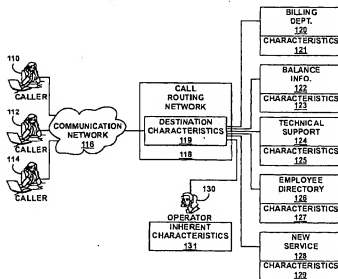
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(54) Title: SYSTEM AND METHOD FOR ROUTING CALLS



(57) Abstract: A method and system of routing calls is disclosed. In a particular embodiment, the method includes prompting a caller of a call for caller information with a first system. The first system has a first interface characteristic. The method further includes selecting a destination for the call based on the caller information. The destination has a second interface characteristic. The method also includes identifying a call interface characteristic change based on a difference between the first characteristic and the second characteristic, and advising the caller of the call interface characteristic change prior to routing the call.

## SYSTEM AND METHOD FOR ROUTING CALLS

### FIELD OF THE DISCLOSURE

The present disclosure relates generally to automatic call routing systems and more particularly, to call transfers in an automatic call routing system.

### BACKGROUND

Automatic call routing (ACR) systems are commonplace for businesses that process high call volumes. A goal of an ACR system is to determine why a customer is calling and to route the customer to an appropriate service department. In order for an ACR system to properly route calls, the ACR system generally interprets the intent of the customer, identifies the type or category of the customer call, and selects a routing destination. Speech recognition technology generally allows an ACR system to recognize natural language statements so that the caller does not have "key-in" the caller's intent. "Keying-in" data on a cell phone while driving can be a dangerous and cumbersome task. There are many different technologies that can be utilized to implement ACR systems and these technologies are often commingled on a single call. For example, a caller may first be greeted by a main ACR system that recognizes a caller's "natural language" and then transferred to an ACR sub-system that can only process touch-tone inputs. When a caller is moved between ACR systems, the change in contexts or interface characteristics can confuse the caller, reducing the call processing efficiency. Hence, there is a need for an improved automatic call routing system.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a simplified configuration of a telecommunication system;

FIG. 2 illustrates a simplified configuration of an automatic call routing system; and

FIG. 3 is a flow diagram that illustrates a method of call processing operation.

### DETAILED DESCRIPTION OF THE DRAWINGS

A method and system are disclosed for informing a caller of interface characteristics while transferring and routing calls. A call is received from a caller and the caller is prompted for information using a dialog system. The dialog (prompting) system may have a first channel, a first modality, and a first persona. Generally, the channel can be a live human interface, a recorded voice, or a digitally synthesized voice, and the modality can be a speech recognition system or a touch-tone recognition system. The persona can be different voice characters with different voice qualities, such as pitch or tone, male or female, etc. Next, the system selects a destination (a second dialog) system for the call based on the caller information. Information or data regarding the difference in interface characteristics (e.g., the channel, modality and persona) is retrieved from a memory. When the selected destination or the second dialog system has different characteristics than the first dialog system, the caller is advised, prior to the transfer of the call, of the characteristics of the new destination. The caller is informed of and prepared to communicate with the second dialog system.

Referring to FIG. 1, an illustrated system 100 including a call center support system 118 is depicted. The system 100 includes a communication network 116, a call service support system 118, such as a call routing network, including one or more interactive voice response systems, and a plurality of potential destinations for a call. Illustrative destinations include a billing department 120, a balance information department 122, a technical support department 124, an employee directory 126, and a new customer service 128. Each department 120-128 has interface characteristics illustrated by reference characters 121-129, respectively. In addition, the call routing network 118 may route calls to an agent, such as the illustrated live operator 130 with inherent characteristics 131. An illustrative embodiment of the call support system 118 may be a call center having a plurality of agent terminals attached. Thus, while only a single operator 130 is shown, it should be understood that a plurality of different agent terminals or types of terminals may be coupled to the interactive voice response system 118, such that a variety of agents may service incoming calls. The communication network 116 receives calls from a variety of callers such as the illustrated callers 110, 112, and 114. In a particular embodiment, the communication network 116 may be a public telephone network or may be provided by a voice over Internet protocol (VoIP) type network.

Each destination entity receiving a routed call has interface characteristics. In a particular embodiment, the interface characteristics can be classified generally as channel, modality, and persona. A channel can be a live human interface, a recorded analog voice, or a digitally synthesized voice. A modality can be a speech recognition system or a touch-tone recognition system. A persona can be different characters having different voices or audio qualities, such as pitch or tone, male, or female, etc. The call support system 118 includes a destination characteristic table 119 that can be a compilation of the interface characteristics 121-131 of each of the destination call centers 120-128 and human agent 130, respectively. For example, while the call support system 118 can utilize a natural language interface, the billing department 120 may use a touch-tone mode and the balance information department 122 may use an interface having a speech recognition modality with a synthesized female voice. While an exemplary sample of characteristics and how they can be classified has been disclosed, different or additional characteristics and classifications may also be used and are within the scope of the present invention.

The call support system 118 can store the destination interface characteristics 121-131 respectively in a characteristics table 119, such as in a computer memory. The call support system 118 can determine the difference in characteristics that will be experienced by the caller as the caller is transferred from the system 118 to a selected destination. Based on the different characteristics that will be encountered by the caller, the call support system 118 can store a message in characteristics table 119 that can be communicated to the caller. The message can provide an explanation of the change in interface characteristics that will be encountered by the caller.

Referring to FIG. 2, a simplified block diagram of a call support system 118 is depicted. The call support system 118 can include a voice generation module 202, a microprocessor 204, a memory 206, a destination characteristics table 208 included in the memory 208, and a switch 210. The call support system 118 can be coupled to a plurality of destinations, as illustrated by block 212. The destinations 212 can be the destinations, as illustrated by departments 120-128 in FIG. 1. The microprocessor 204 can control call processing by

retrieving and executing instructions in memory 206 and by activating the voice generation module 202 to produce audio for an incoming call. Microprocessor 204 can also control switch 210 to route the call to one of the destinations 212. When the destination of a call is selected or determined based on the caller information, the microprocessor 204 obtains data from memory, such as the destination characteristics table 208.

- 5 In response to the interface characteristics, the processor 204 can determine if the destination has similar or different interface characteristics or by referencing the table 208. If a destination 212 to which the call will be routed has different characteristics, the microprocessor 204 initiates the voice generation module 202 to notify the caller of the change in characteristics. For example, the voice generating module 202 in response to an incoming call, may submit, "May I help you?" Wherein the caller responds, "I've got a question about my
- 10 bill." The voice generating module 202 replies, "I think I understand. You would like to go over some charges on your bill, is that right?" In response, the caller says, "Yes." Then, the voice generating module 202 says, "Okay, we will route you to an automated system that can provide your bill balance. You will have to use the buttons or the keypad to use this system. I will connect you now." In this example, the call support system 118 switches the caller from a first system with speech recognition system to a second system with
- 15 touch-tone recognition. Thus, the modality of the call processing system was changed. Informing the caller of changes in interface, such as a change in modality, persona, or channels provides improved call routing performance, often leading to fewer dropped calls.

- Referring to FIG. 3, a method of operation 300 that may be used in connection with the system 100 of FIG. 1 is illustrated. The method starts at 302 and proceeds to step 304. At step 304, a caller is greeted and prompted for information. Caller information is received and stored, at step 306, and the method selects a destination for the call based on the received caller information, at 308. At step 310, a prompt message is selected to be played. The prompt message may be based on a difference between the interface characteristics of the current system (in this case the initial receiving system) and the interface characteristics of a selected destination system. Discontinuity in characteristics such as channel, modality, or persona can be determined by
- 20 referencing a look-up table. The message may inform the caller of one or more interface characteristics of the destination system or of changes in interface characteristics that will be experienced by the caller prior to the next dialog. Next, at step 312, the caller can be advised of the changes in interface characteristics that may be encountered in the dialog with the selected destination system. However, if the next dialog or the downstream interface has characteristics that are the same or similar to the current dialog characteristics, the method may
- 30 be silent and provide a transition that is transparent to the caller. A dialog can be defined as any interaction between a caller and an ACR. At step 314, the call is routed or transferred to the destination system. Caller information, such as the information previously stored at step 306, can be sent to the destination with the call. At decision step 315, it is determined whether servicing of the call has been completed. If call servicing has not been completed, then the method returns to step 304 where a caller is prompted for further information and
- 35 the process repeats. If call service is completed, the method ends, at block 316.

The above-disclosed subject matter is to be considered illustrative, and not restrictive, and the appended claims are intended to cover all such modifications, enhancements, and other embodiments that fall within the true spirit and scope of the present invention. Thus, to the maximum extent allowed by law, the scope of the

present invention is to be determined by the broadest permissible interpretation of the following claims and their equivalents, and shall not be restricted or limited by the foregoing detailed description.

**WHAT IS CLAIMED IS:**

1. A method of routing calls comprising:

prompting a caller of a call for caller information with a first system, the first system having at least a first interface characteristic;

5 selecting a destination for the call based on the caller information, the destination having at least a second interface characteristic;

identifying a call interface characteristic change based on a difference between the at least first characteristic and the at least second characteristic; and

advising the caller of the call interface characteristic change prior to routing the call.

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2. The method of claim 1, wherein the at least first interface characteristic includes at least one of a channel, a modality and a persona.

3. The method of claim 1, wherein the at least second interface characteristic includes at least one of a

15 channel, a modality and a persona.

4. The method of claim 2, wherein the channel is one of a live agent and a recorded voice.

5. The method of claim 2, wherein the modality is one of speech or touch-tone.

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6. The method of claim 2, wherein the persona is a first digital voice personality or a second voice personality.

7. The method of claim 3, further comprising transmitting caller data with the call.

25 8. The method of claim 3, further comprising notifying the caller of forthcoming events.

9. The method of claim 1, further comprising referencing a table to determine the call interface characteristic change.

10. The method of claim 2, further comprising selecting a method of transferring the call based on the channel, modality and persona.

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11. The method of claim 1, further comprising selecting a first prompt based on the first interface characteristic.

12. A system comprising:

a voice-generation module to prompt a caller of a call, the voice-generation module having a first interface characteristic;

- 5 a processor to select a call destination from a plurality of call destinations based on a caller's response to the prompt, the selected call destination having a second interface characteristic; and  
memory configured to store a message based on the second interface characteristic, wherein the prompt of the voice-generating module is based on the stored message.

13. The system of claim 12, wherein the processor selects the message based on a difference between the first interface characteristic and the second interface characteristic.

- 10 14. The system of claim 12, wherein the first interface characteristic is a voice recognition input and the second interface characteristic is a touch tone input.

15. The system of claim 12, wherein the first characteristic is a digitally synthesized voice and the second characteristic is a live human voice.

- 15 16. The system of claim 12, wherein the first characteristic is a female voice and the second characteristic is a male voice.

17. The system of claim 12, wherein the prompt is performed consistent with the first interface characteristic.

18. A method of routing calls comprising:

receiving a call from a caller;

prompting the caller for information using a dialog based system, the dialog based system having a first channel, a first modality, and a first persona;

- 20 determining a destination for the call, the destination having a second channel, a second modality and a second persona;

notifying the caller of the second channel;

notifying the caller of the second modality;

- 25 notifying the caller of the second persona; and

routing the call to the destination.

19. The method of claim 18, wherein the caller is advised of the second channel, the second modality, and the second persona prior to a transfer of the call to the destination.

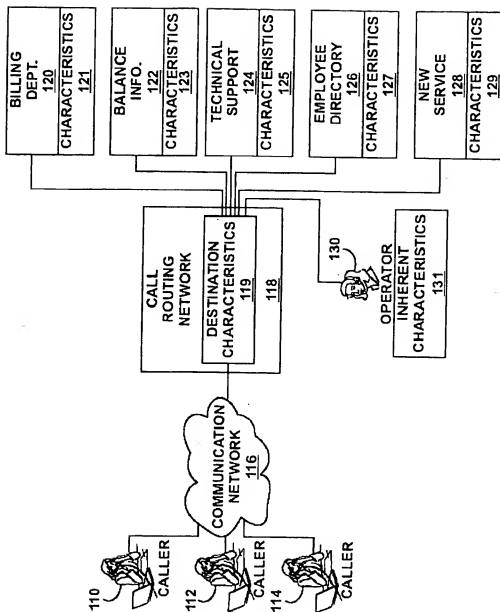


FIG. 1



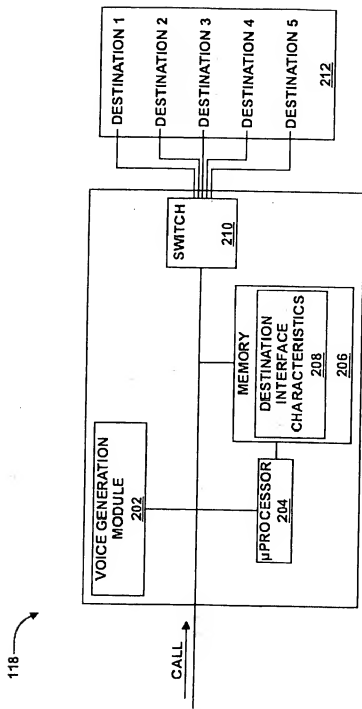


FIG. 2

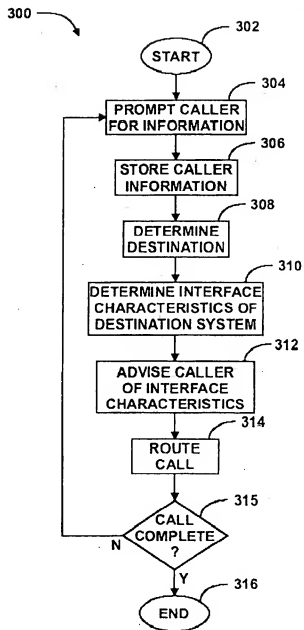


FIG. 3